

A photograph of a traffic light at night. The traffic light is a vertical signal with three lenses, and the green light is illuminated. It is suspended from a horizontal pole. In the background, there is a road with white lane markings and several cars moving, their lights blurred into streaks of red, yellow, and white. The overall scene is dark, with the primary light sources being the traffic light and the car headlights/tailights.

Signals and Geometrics Section

Richard E. Mullinax, PE

Section Head

rmullinax@dot.state.nc.us

Late Night Flashing Operation of Traffic Signals


Traffic Engineering Conference

September 8-10, 2004

Asheville, NC

A Brief History of Late Night Flashing Operation

- Practice became popular during the height of the energy crisis.
- Viewed as the most efficient form of signal operation during the hours of low traffic volumes (reduced delay, vehicle emissions, & fuel consumption).
- May have offered some secondary benefit with regards to traffic signal malfunctions (bad detection loops).
- Traditional practice has been to flash the traffic signal unless the engineer deems otherwise.

An aerial, grayscale photograph of a city street intersection. Several cars are visible on the road, and buildings line the sidewalks. The image is slightly blurred, giving it a candid, observational feel.

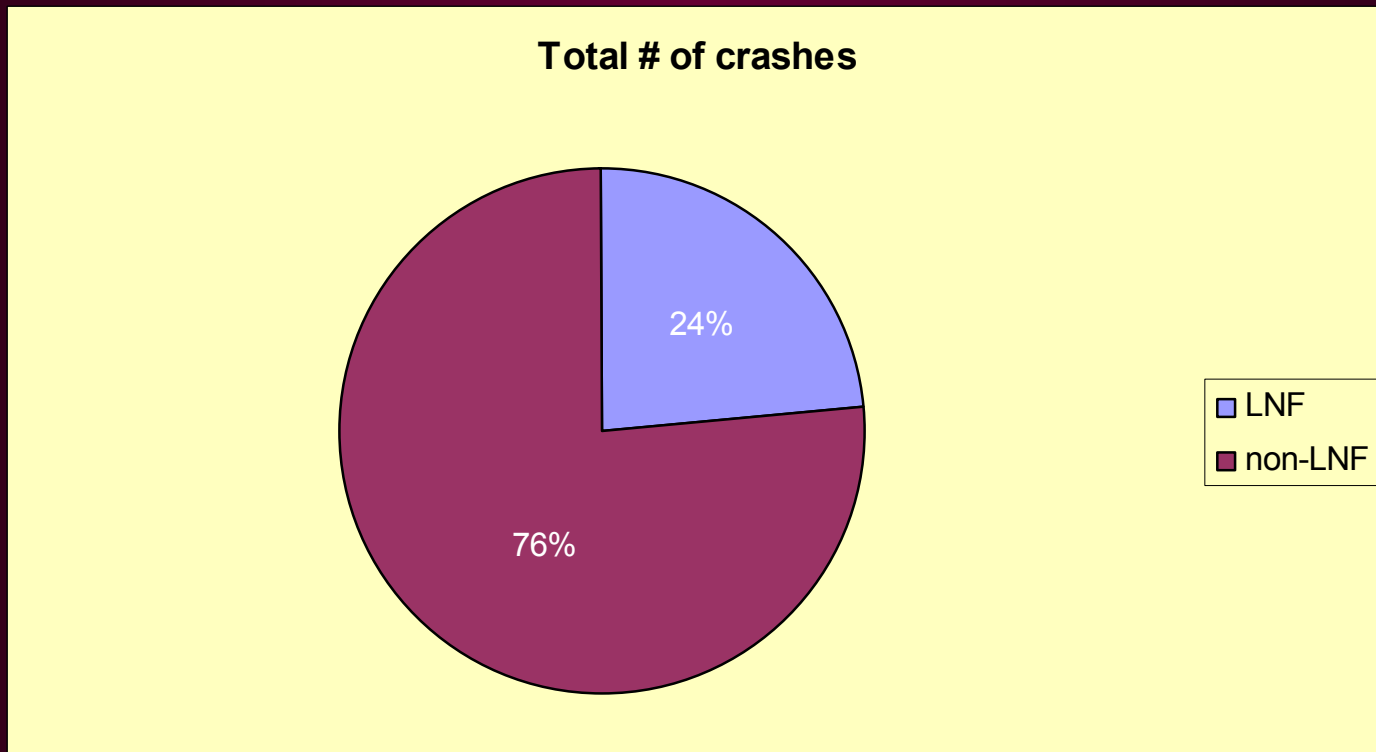
Late Night Task Force

- A few high profile crashes involving tort liability cases at traffic signals operating in Late Night Flash (LNF) prompted an evaluation of existing practices.
- Over 50 sites in Wake and Durham counties were investigated; 13 were chosen based on the high number of LNF crashes.
- A NCSITE Task Force was formed in January 2003 with 23 participants invited to serve.
- Participants represented NCDOT, municipalities, and private engineering firms.

Study Results

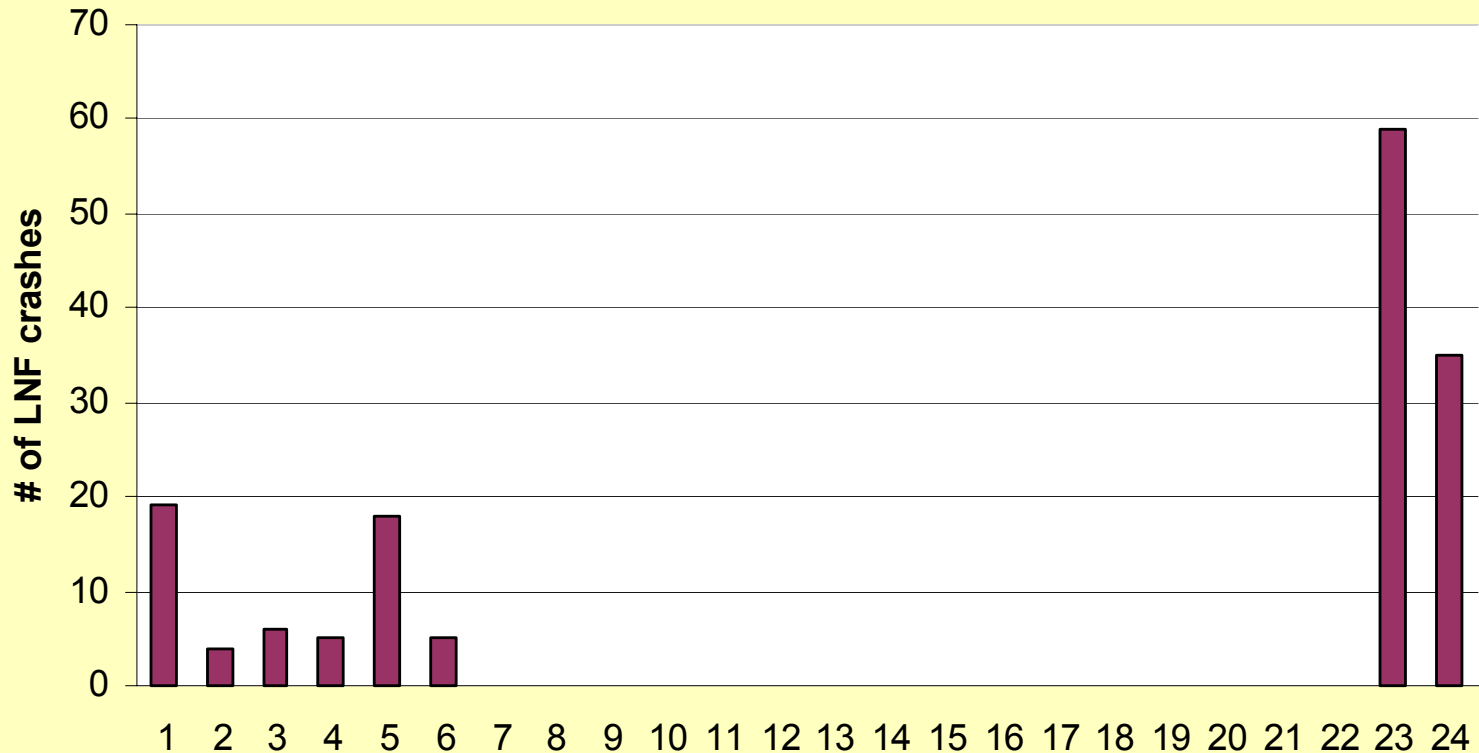
636 total crashes

151 LNF crashes



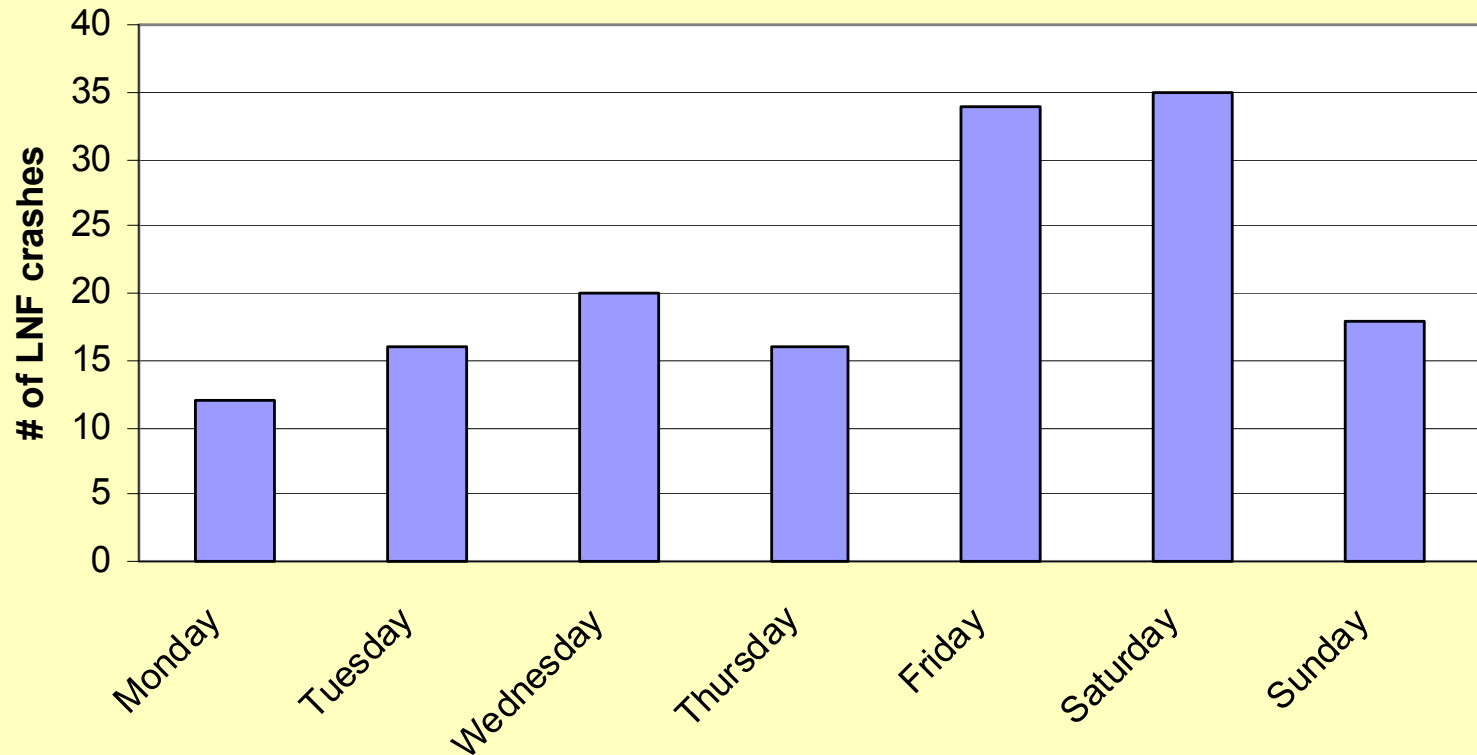
Study Results (cont.)

- 35% of all injury crashes were LNF crashes
- 67% of LNF crashes were injury crashes
- Cost of LNF crashes = \$1.33 million
- 62% of LNF crashes occurred between 11 pm - 1 am



Study Results (cont.)

- 46% of LNF crashes occurred between Thursday and Saturday.



A Case Study



- On July 22, 2003, a Durham police officer was placed on Administrative Duty after patrol car collided with a jeep
- The wreck happened around 1:05 a.m. at the intersection of Morehead and Vickers Avenue in Durham, NC.
- Police said the right front of a 1999 Jeep Wrangler driven by a 17-year-old collided with the driver's-side passenger compartment of a 2001 Ford patrol car driven by a Police Officer.
- The Jeep was southbound on Vickers Avenue, and the patrol car was going east on Morehead Avenue.

Case Study (cont.)

- The patrol car did not stop at a flashing red light, according to a preliminary report from the Police Department's Traffic Services Division.
- In March 2004, the Durham police officer pleaded responsible to running a flashing red light in connection with an accident that killed a teenager.
- The police officer was fined \$100 and will pay court costs.
- He resigned from the Durham Police Department.

Task Force Results

NC Supplement to the MUTCD Revisions

- > Off-peak hours changed from “11:00 pm - 6:00 am” to “Midnight - 5:00 am.”
- > Guidance changed from “Traffic signals should operate in flashing operation unless it is determined that the flashing operation could jeopardize the safety of travel through the intersection.” to “Traffic signals may operate in either steady or flashing operation mode during off-peak hours based on the operational needs of the traffic signal.”
- > Added guidance that “the agency responsible for operation of the traffic signal should provide a periodic review program to ensure that the flashing operation is not detrimental to safe travel through the intersection.”

NCDOT LNF Monitoring Program

- > Practice was adopted February 4, 2004.
- > Requires an operational study by the Division Traffic Engineer in conjunction with the Regional Traffic Engineer and the Municipal Traffic Engineer when applicable.
- > In the event a mutual agreement cannot be reached on the use of LNF, the final decision will rest with the State Traffic Engineer or designee.
- > Requires the Division Traffic Engineer to notify the State Traffic Engineer and Regional Traffic Engineer when a traffic signal is placed on LNF so that it can be monitored.

NCDOT LNF Monitoring Program

(cont.)

- > The Traffic Safety Systems Management Unit (TMSSU) will scan all locations on the list of LNF traffic signals at least once every three months.
- > If safety issues are identified by the TMSSU, the Division Traffic Engineer and the Regional Traffic Engineer will be notified.
- > The Division Traffic Engineer and the Regional Traffic Engineer will conduct an investigation to determine if LNF times need to be modified (or if LNF needs to be removed).
- > The Division Traffic Engineer is required to notify the State Traffic Engineer of any changes made to the traffic signal.

Considerations for Use of Late Night Flashing Operation

- Traffic signals with preemption, excluding railroad preemption, may be considered for off peak late night flashing operation if it is determined that the operation of the vehicle benefiting from the preemption is not otherwise significantly impacted and safe travel through the intersection is not jeopardized. Traffic signals with railroad preemption will not be programmed for off peak late night flashing operation.
- Off peak late night flashing operation may be considered when the two-way volume on the major street is less than 200 vehicles per hour.
- Off peak late night flashing operation may be considered if an intersection has experienced less than two accidents during times that the signal will flash in the most recent two-year period while the signal was operating in a steady mode.

Considerations for Use of LNF (cont.)

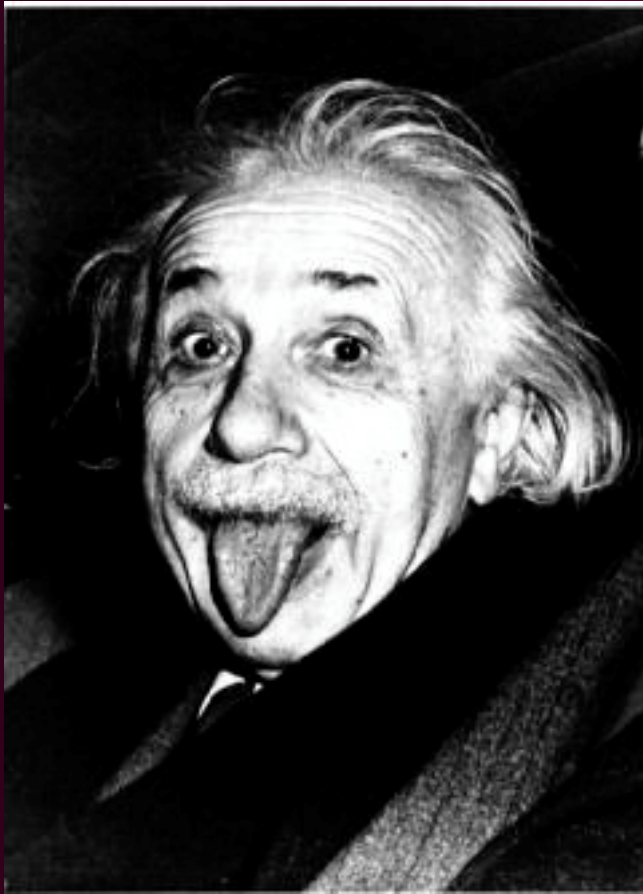
- Steady mode operation should be considered if two or more right angle crashes occur during flashing operation within a 12-month period.
- Steady mode operation should be considered for locations in the vicinity of numerous late night businesses such as nightclubs. If off peak flashing operation is utilized at these locations, the start of flashing operation may be delayed during specific days or times such as Thursday through Saturday.
- Steady mode operation should be considered for locations with limited sight distance on any approach, or where geometric and environmental constraints are not conducive to off peak late night flashing operation.

Considerations for Use of LNF (cont.)

- The mode of operation (steady or off peak late night flashing) should be consistent with the operation of other traffic signals along a corridor or in the general vicinity.
- Traffic signals will not be programmed for flash during periods other than off peak late night hours except for flashing during a signal malfunction.
- Due to potential short-term and long-term fluctuations in volumes, the engineer should be aware that care must be exercised in using vehicular volumes for determining the use of off peak late night flashing operation. Such fluctuations may be either permanent or temporary. Basing off peak late night flashing operation solely on volumes may require the engineer to periodically evaluate the intersection for changing volumes.

Concluding Remarks

(It's not rocket science.)



- Existing traffic signals with late night flashing operation may be “grandfathered” into the program providing there have been no identified safety issues with the LNF. However, they should be identified for monitoring purposes.
- Guidelines are not “written in stone.” Use engineering judgement.
- When in doubt, use “steady mode” operation.



For More Information
Please Contact:

Richard Mullinax, P.E.

(919) 733-5569

rmullinax@ncdot.state.nc.us